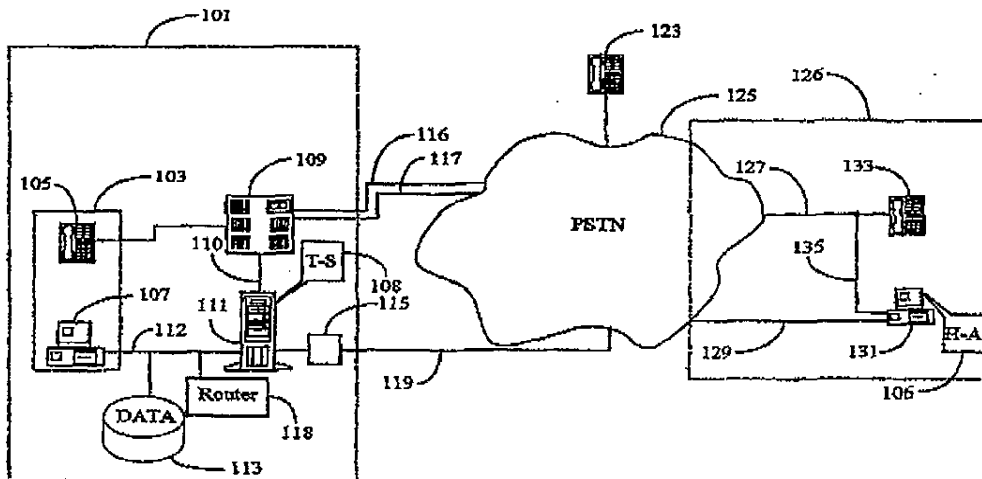**PCT**

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : H04M 3/00	A1	(11) International Publication Number: WO 99/17518
		(43) International Publication Date: 8 April 1999 (08.04.99)

(21) International Application Number: PCT/US98/18833

(22) International Filing Date: 9 September 1998 (09.09.98)

(30) Priority Data:
08/940,712   30 September 1997 (30.09.97)   US

(71) Applicant: GENESYS TELECOMMUNICATIONS LABORATORIES, INC. [US/US]; 11th floor, 1155 Market Street, San Francisco, CA 94103 (US).

(72) Inventors: BONDARENKO, Oleg; 2707 35th Avenue, San Francisco, CA 94116 (US). ISSAYEV, Valeriy; 6226 Shelter Creek Lane, San Bruno, CA 94066 (US). SHTIVELMAN, Yuri; 2811 Monte Cresta Drive, Belmont, CA 94102 (US). KIKINIS, Dan; 20264 Ljepava Drive, Saratoga, CA 95070 (US).

(74) Agent: BOYS, Donald, R.; P.O. Box 187, Aromas, CA 95004 (US).

(81) Designated States: AU, CA, CN, JP, KP, RU, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Published
With international search report.

(54) Title: HOME AGENT CALL CENTER SYSTEM AND METHOD

(57) Abstract

A call center system supports remote agent stations (126) through a network (125) by establishing a data link (119, 129) between a computer platform (131) at the remote agent station (126) and a computer–telephony integration (CTI) processor (111) connected to a telephony switch (109) at a call center (101) and switching incoming calls from the call center (101) to a telephone (133) at the remote agent station (126) while sending data pertaining to the calls via the data link (119, 129) to the computer platform (131) at the remote agent station (126) to be displayed.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav	TM	Turkmenistan
BF	Burkina Faso	GR	Greece		Republic of Macedonia	TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's	NZ	New Zealand		
CM	Cameroon		Republic of Korea	PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

HOME AGENT CALL CENTER SYSTEM AND METHOD

by Inventors
Oleg Bondarenko, Valery Issayev, Yuri Shtivelman, & Dan Kikinis

5

Field of the Invention

10 The present invention pertains to telephony communications systems and has particular application to methods including software enabling a home agent operating away from an associated call center to operate with full call center functionality and resources.

Cross-Reference to Related Documents

15

The present invention is a continuation-in-part of copending patent application S/N 08/840,125, filed April 3, 1997, which prior application is incorporated herein in its entirety by reference.

20 ## Background of the Invention

Telephone call processing and switching systems are, at the time of the present patent application, relatively sophisticated, computerized systems, and development and introduction of new systems continues. Much information on the nature of such 25 hardware and software is available in a number of publications accessible to the present inventors and to those with skill in the art in general. For this reason, much minute detail of known systems is not reproduced here, as to do so would obscure the facts of the invention.

At the time of filing the present patent application there continues to be 30 remarkable growth in telephone-based information systems. Recently emerging examples are telemarketing operations and technical support operations, among many others, which have grown apace with development and marketing of, for example,

1

sophisticated computer equipment. In some cases organizations develop and maintain their own telephony operations with purchased or leased equipment, and in many other cases, companies are outsourcing such operations to firms that specialize in such services.

5   In a call center, a relatively large number of agents handle telephone communication with callers. Each agent is typically assigned to a telephone connected to a central switch, which is in turn connected to a public-switched telephone network (PSTN), well-known in the art. The central switch may be one of several types, such as Automatic Call Distributor (ACD), Private Branch Exchange

10   (PBX), or a Central Office switch equipped with Centrex ACD service.

        An organization having one or more call centers for serving customers typically provides one or more telephone numbers to the public or to their customer base, or both, that may be used to reach the call center service. The number or numbers may be published on product packaging, in advertisements, in user manuals,

15   in computerized help files, and in any other convenient way. In most cases, when the numbers provided are toll-free numbers, a Service Control Point (SCP) directs the routing of the to one or another of associated call centers.

        Routing of calls may be on several levels. Initial routing may be done at SCPs, and further routing may be accomplished at individual call centers. Intermediate

20   routers may also be used. As described above, a call center typically involves a central switch, which may have, for example, an Automatic Call Distributor (ACD) and may be a Private Branch Exchange (PBX), or a Centrex service. The central switch is typically connected to the public-switched telephone network (PSTN). Agents, trained to handle customer service, operate telephones connected to the

25   central switch.

        If the call center consists of just a switch and connected telephone stations, the routing that can be done is very limited. Switches, such as PBXs and PABXs and the like, although increasingly computerized, are limited in the range of computer processes that may be performed. For this reason additional computer capability in

30   the art has been added for such switches by connecting computers adapted to monitor switch activity and to control switch functions. The processes of incorporating

2

computer enhancement to telephone switches is known in the art as Computer
Telephony Integration (CTI). The connected computers execute CTI applications
provided to enhance switch and call center functions.

In a call center, agent stations having telephones connected to the switch may
5   be equipped also with computers including video displays, such as PCs, so agents
operating such stations may have access to stored data as well as being linked to
incoming callers by a telephone connection. Such stations may be interconnected in a
local area network (LAN) by any one of several known network protocols, and there
may be other servers connected to the LAN as well, such a file servers and the like. In
10   CTI enhanced systems the LAN may also connect to the CTI processor.

When a call arrives at a call center, whether or not the call has been pre-
processed at a SCP, typically at least the telephone number of the caller is made
available to the receiving switch at the call center by a telephone carrier. This service
is available by most PSTNs as Automatic Number Identification (ANI) information
15   in one of several formats. If the call center is computer-enhanced (CTI) the phone
number of the calling party may be used to access additional information from a
database at a server on the network that connects the agent workstations. In this
manner information pertinent to a call may be provided to an agent.

Even with present levels of CTI there are still problems in operating such call
20   centers, or a system of such call centers. There are waiting queues with which to
contend, for example, and long waits may be experienced by some callers, while other
agents may be available who could handle callers stuck in queues. Other difficulties
accrue, for example, when there are hardware or software degradations or failures or
overloads in one or more parts of a system. Still other problems are due to known
25   latency in conventional equipment. There are many other problems, and it is well
recognized in the art, and by the general public who have accessed such call centers,
that there is much room for improvement in the entire concept and operation of such
call center systems. It is to these problems, pertaining to efficient, effective, timely,
and cost-effective service to customers (patrons) of call center systems that aspects
30   and embodiments of the present invention detailed below are directed.

Corporations are faced with a challenge to provide consistent levels of customer service in an environment where call volumes are constantly changing. For example, a public response to a TV advertising campaign might require staffing levels far above average. Corporations are in constant need to flexibly change the number of agents based on variable volumes of calls.

One possible solution considered by providers of call center services is a home agent solution, wherein agents may be remotely based from the call center. This concept involves setting up home-based agents with the necessary equipment and lines so as to allow the agent to operate remotely but still retain access to call center functions such as call routing functions, customer information system (CIS) resources, conferencing options, and the like, that are provided to agents operating at the call center.

A problem with this remote agent, or home agent, concept prior to the time of the present invention is that all known implementations of home agent systems require dedicated hardware such as leased lines for both voice and data, special add-on cards enabling communication protocols to be converted, and special proprietary telephones made to operate remotely over such dedicated lines and circuits. Therefore, the expense of enabling multiple agents to function remotely can be very significant, and even much higher than the normal operating costs of expanding or upgrading the call center to accommodate more agents.

What is clearly needed is a method and apparatus whereby a company can station agents in remote locations other than at the call center, such as in their own homes, and still provide full call center functionality and CIS accessibility, without the requirement for added dedicated and proprietary equipment and special leased lines. A solution such as this would reduce company costs and increase call center efficiency and flexibility.

4

Summary of the Invention

In a preferred embodiment of the present invention a home agent call center
system is provided, including methods of practicing the invention with the call center
5 system, comprising a telephony switch connected to a first trunk adapted for receiving
incoming calls from a telephony network, and to a second trunk adapted for placing
outbound calls into the network; a computer telephony integration (CTI) processor
connected to the telephony switch and to a data base, the CTI processor executing a
CTI application; an agent station remote from the call center, the agent station having
10 a telephone connected by a first telephony line to the telephony network and a
computer platform with a video display unit (PC/VDU) connected by a second
telephony line through a modem to the telephony network; and a data port associated
with the CTI processor adapted to establish a data connection. The data connection is
established between the CTI processor and the computer station at the remote agent
15 station, and as incoming calls are switched to the remote agent station, data pertaining
to each incoming call is retrieved from the data base and sent via the open data link to
the computer platform at the remote agent station to be displayed on the VDU.

In some embodiments the data connection is established prior to a first call
being switched to the remote agent station, and is maintained open thereafter as
20 further calls are switched to the remote agent station. In other embodiments the
computer platform at the remote agent station is characterized by a TAPI-compliant
device connected to the telephone such that the computer platform may detect
incoming telephone calls, and, upon detecting a call from the call center, the computer
platform immediately dials up the CTI-processor and establishes the data link by a
25 reduced log-in procedure allowing a minimum-time connection. In yet another
embodiment the CTI-processor is characterized by having a modem bank adapted to
dial outgoing calls, and, as a call is selected to be switched to the remote agent station,
the modem bank dials the remote agent station and establishes the data connection.
The telephony network is a publicly-switched telephony network or any private or
30 other wide-area network..

In some embodiments the data link is established over the telephony network,
and in others over the Internet, wherein the CTI-processor is adapted as an Internet-

5

connected server, and the data link is established by the computer platform at the agent station dialing up an Internet service provider (ISP) and establishing an Internet link to the CTI-processor.

All call center services available to locally-connected agents are made available also to remote agents by compatible software executing on the CTI-processor and on the computer platform at the remote agent stations. Plural stations will typically be supported from a single CTI-enhanced call center. Advantages of the invention are realized through processes of maintaining the data connection continuously between the remote station and the call center, or, if the connection is to be broken between calls, establishing procedures described in full detail below, for establishing and using the data connection very quickly as it is needed with each new call switched to a remote agent station. The invention in its several embodiments provides remote agent capability without necessity for leased lines, dedicated hardware, and proprietary telephones and the like. Through the teachings of the invention remote agent stations may established at any location where a telephone and a computer station is available, with two lines so voice calls and data may both be supported. The two lines may be two POTS lines or the two channels of an ISDN connection.

Brief Description of the Drawing Figures

Fig. 1 is an overview of a call center and connected home agent according to an embodiment of the present invention.

Description of the Preferred Embodiments

Fig. 1 is an overview of a call center and connected home agent system according to an embodiment of the present invention. In this embodiment a
5   functioning call center 101 and at least one remote workstation 126 are each connected to a Public Switched Telephone Network (PSTN) 125. For purposes of convenient description station 126 may be considered to be in an agent's home, but this is not required. A client telephone 123 is shown connected to PSTN 125 as well, and represents many telephones available to persons who may use the services of the
10   call center and an agent at either workstation 126 or at the call center.

Call center 101 in this embodiment comprises a telephony switch 109 that is connected typically to a number of agent workstations, such as agent workstation 103, each having a telephone 105 and a PC 107 having a video display unit (PC/VDU). There are also typically several to many such agent workstations in such a call center.
15   Switch 109 in this embodiment is enhanced by a computer-telephony integration (CTI) processor 111 connected to the switch by a CTI link 110. Processor 111 and the PC/VDUs at agent workstations are connected on a local area network (LAN) 112. Also connected to the LAN within call center 101 is a file server 113 supporting a client database, and there may be other servers on the LAN as well.

20   It will be apparent to those with skill in the art that call center 101 may contain a large number of agent stations such as agent satiation 103 as well as multiple file servers, storage units and other equipment without departing from the spirit and scope of the invention. In this embodiment only one unit of each type at a call center is shown, and this minimum arrangement is deemed adequate to fully describe
25   embodiments of the present invention. Similarly, only one home agent workstation is shown, although there may be many such stations in alternative embodiments of the invention.

A client typically contacts call center 101 using client telephone 123. An incoming call from a client is routed through PSTN 125 and into telephony switch
30   109 via trunk 116 in this embodiment. Telephony switch 109 may be of the form of a Private Branch Exchange (PBX) or Automatic Call Distributor (ACD), or any other type of telephony switch known in the art and suitable for call center utilization.

7

In a preferred embodiment of the present invention agent station 126 and call center 101 have a dual connection. One of the two connections is a telephone link between the home agent's telephone 131 and telephony switch 109 at the call center. In various embodiments of the invention a plurality of outgoing call ports are reserved

5 for home agent connection. One such line 117 is illustrated in Fig. 1 for the telephone link from switch 109 to home agent station 126, which is completed from the PSTN via line 127 to the home agent's station.. The other connection is a data connection between the home agent's PC and data services at the call center. In a preferred embodiment this link is made via a telephony link 129 from home agent station 126

10 via the PSTN to CTI processor 111 at the call center. Lines 127 and 129 at the home agent station may be in one instance two POTS lines (plain old telephony service), or the B channels of an ISDN connection (2B+D).

In the embodiment shown, CTI processor 111 executes CTI functionality by virtue of a proprietary routine 108 known to the inventors as T-Server. When the call

15 from phone 123 enters PBX 109, a proprietary routine 118 known as a Router is alerted. Router 118 can be a separate unit connected to PBX 109 trough processor 111 as shown in Fig 1, or may be implemented in other ways. Router 118 selects the best available agent to answer the call. If the Home Agent is selected, then the call is transferred to telephone 133 through trunk 117 and line 127, and associated data is

20 transferred to the home agent's workstation 131 through the data link 119 and 129. Remote agent functionality in conjunction with T-Server is provided at each remote agent station by executing code routines 106 known to the inventor as Home Agent. In this embodiment it is necessary that the T-Server be compatible with Home Agent for the system to function properly. In other embodiments the software applications

25 may execute on different platforms. Given the teaching herein, it will be apparent to those with skill in the art that this is but one example of many implementations that may be made.

There are a variety of ways a data link may be established and maintained for Home Agent functionality. In the embodiment illustrated by Fig. 1, for example, and

30 the data connection is by a dial-up telephony connection to a modem bank 115 at the CTI processor. The modem bank in this embodiment is adapted to serve as many home agents as there are dedicated ports for home agent connection.

8

There are a number of other ways the data link may be established and maintained. One is by an Internet connection made by the home agent PC through an Internet Service Provider (ISP) dial up, wherein the CTI server is adapted as an Internet-connected server. NT and UNIX dial-ups are other options. The detailed

5   nature of the data connection is not basic to the invention, and many options will be apparent to those with skill in the art.

The way the data connection is made and used relative to calls switched to home agents is important to the invention. In one embodiment the home agent logs in in a manner similar to a login procedure for an agent at a call center. That is, the

10   home agent, at the beginning of a session, dials up the data connection, which initiates a log-in procedure, which after completion connects the home agent's PC/VDU to CTI processor 111, and indirectly to LAN 112 at the call center, and provides for the home agent the CIS service and functions available to all other agents associated with the call center. In this preferred embodiment the data connection, once made, is kept

15   active until the home agent logs off.

In this preferred embodiment, wherein the data connection is kept active, when a call arrives at telephony switch 109 from a client at a telephone represented by telephone 123, and it is determined (for whatever reason) that the call is to go to home agent 126, router 118 directs the switch to transfer the call to home agent station

20   126. An outgoing call is placed to telephone 133 at the home agent's station, and at the same time data arriving with the call or accessed from database 113 using information derived from the call is transmitted to PC/VDU 131 at the home agent's station via the always-open data connection. In this manner a screen pop with client information and a script for the agent may be displayed on the VDU of PC/VDU 131

25   at the agent's station by the time the call arrives, or even before the call arrives. When the telephone connection is made the call from the client is switched to telephone 133.

The home agent station has a virtual SoftPhone connection 135 from the telephone to the PC/VDU. This connectivity and functionality is implemented in one embodiment by a TAPI-compliant modem or bridge at the PC/VDU to which voice

30   line 127 interfaces as well as to telephone 133. This connection enables the Home Agent application 106 to have all telephony controls over phone 133. It ensures that the application behaves in same manner whether the agent is located at home, or at the

9

Call Center. It is not strictly required that there be a physical telephone and a physical connection as shown in Fig. 1, however. There are, in alternative embodiments, a number of ways that the SoftPhone connection may be implemented. There are, for example, commercially available applications wherein a telephone may be simulated by software in the PC. There are other implementations as well. What is important is that the SoftPhone is enabled to do outbound dialing for both telephone 133 and data line 129 (modem-connected), and provides other functions as well, such as voice recording, and caller ID.

In an alternative embodiment it is not necessary that the data connection be constantly maintained. In this embodiment, at the call center end of the data connection a full log-in is accomplished when an agent first dials up and logs in from a home agent station, then a simplified log-in is enabled requiring essentially only that the agent station be verified from calling party identification data when a subsequent dial up is made from the agent station during a normal shift time, until the agent formally logs off. In this embodiment, when a call is switched to a home agent, the arriving call at the home agent station from the call center triggers the modified dial up, establishing the dial up data connection more quickly than could be done by a more formal log in. . In the minimum log-in embodiment the TAPI interface recognizes an incoming call and automatically dials up the data connection, which, by virtue of the minimum log-in may be established quickly, so data may be provided to the home agent without creating undue delay.

In yet another embodiment unique capability is provided at the call center end of the data link, providing functionality, once an agent has formally logged in, for the call center to dial the agent's PC and establish the data connection. In this case no further log in or verification is needed, and each time a call is switched to the home agent's station, the call center re-establishes the data connection and provides the data for the agent at the agent's PC/VDU. This implementation is nearly as fast as keeping the data link always open, allowing the data and telephone connection to be done as quickly as the voice call is accomplished. In this embodiment circuitry 115 has dialing capability controlled by T-Server 108.

10

The scope of preprogrammed criteria used to determine whether or not a home
agent will be utilized can be unlimitedly broad without departing from the spirit and
scope of the present invention. For example, in one embodiment, a home agent may
be used only at a certain time of day. In another embodiment, the home agent may be
5   brought in to play after a certain level of incoming calls is detected. In still another
embodiment, the home agent may be responsible for answering specific types of
requests, and so on.

It will be apparent to one with skill in the art that varying degrees of software
integration can be present wherein different commands and functions are utilized
10   without departing from the spirit and scope of the present invention. For example,
this instant embodiment describes a control routine used with a typical incoming call
to a call center that is predetermined to be transferred to a home agent for disposition.
In another embodiment, a different control routine will be used where the incoming
call is transferred to a home agent and then linked with a third party (conference
15   calling). Routines for different features available to the call center and subsequently
to the home agent such as call forwarding, call waiting, transferring to another call
center , and so on will be tailored for each instance. Furthermore, it is intended by the
inventor that the present invention supports alternative media types such as Web
conferencing, Video Desktop conferencing, and E-mail. With an appropriate ISDN
20   connection and software, all known types of media are supported. It will also be
apparent to one with skill in the art that more than one agent can be active and
communicating on more than one connected device at the home agents location
without departing from the spirit and scope of the present invention. For example,
multipoint ISDN configurations are known in the art and allow several users to share
25   the same lines. In another embodiment , Internet connectivity could be maintained by
the virtual home agent and the call center whereby an incoming call results from a
clickable icon or link embedded in a Web page. In still another embodiment wireless
forms of communication may be utilized such as satellite-based communication, and
wireless LAN. It is known to the inventor that systems utilizing wireless forms of
30   communication can be linked to a PSTN network and to the Internet to allow for
various network schemes and added multimedia capabilities. The present Invention is
limited only by the claims that follow.

11

What is claimed is:

1. A method for establishing a remote agent station from a call center, comprising steps of:

5
        (a) establishing a data link between a computer platform at the remote agent station and a CTI processor connected to a telephony switch at the call center;

        (b) determining to switch a selected one of the incoming calls to an agent at the remote agent station;

10
        (c) retrieving data associated with the selected incoming call from a database at the call center;

        (d) forwarding the data associated with the selected incoming call to the computer platform at the remote agent station via the data link;

        (e) placing a call from the call center to a telephone at the remote agent station;

15
and

        (f) switching the selected incoming call to the remote agent station.

2. The method of claim 1 wherein the CTI processor at the call center and the computer platform at the remote agent station each have a modem connected by a

20
telephony line to a telephony network, and in step (a) the data link is established by the computer platform dialing up the CTI processor through the telephony network.

3. The method of claim 2 wherein the telephony network is a publicly-switched telephony network..

25

4. The method of claim 1 wherein the CTI processor at the call center is adapted as an Internet server, and in step (a) the data link is established by the computer platform at the remote agent station dialing up an Internet service provider and establishing an Internet connection to the CTI processor.

30

12

5. The method of claim 1 wherein, in step (e), the data forwarded is displayed as a screen pop on a video display connected to the computer platform at the remote agent station.

5 6. The method of claim 5 wherein the screen pop includes a script for the agent at the remote agent station.

7. The method of claim 1 wherein first control routines executing at the CTI processor and second control routines executing at the computer platform at the
10 remote agent station are adapted to cooperate over the data link to provide call center services to the agent at the remote agent station.

8. A method for establishing a remote agent station from a call center, comprising steps of:
15   (a) implementing a dial-up data link between a computer platform at the remote agent station and a CTI processor connected to a telephony switch at the call center, wherein enabling the data link includes a log-in procedure, and wherein once established, the connection may be renewed after being broken by a reduced log-in procedure;
20   (b) receiving incoming calls at the call center;
        (c) determining to switch a selected one of the incoming calls to an agent at the remote agent station;
        (d) placing a call from the call center to a telephone at the remote agent station via a telephone line connected to the telephone;
25   (e) detecting the incoming call by a TAPI-compliant device connected to the computer platform at the remote agent station and to the telephone line to the telephone at the remote agent station, initiating thereby a dial up of the data link with the reduced log-in procedure;
        (f) switching the selected incoming call to the remote agent station;
30   (g) retrieving data associated with the selected incoming call from a database at the call center; and

(h) forwarding the data associated with the selected incoming call to the computer platform at the remote agent station via the open data link.

9. The method of claim 8 wherein the CTI processor at the call center and the computer platform at the remote agent station each have a modem connected by a telephony line to a telephony network, and in step (e) the data link is established by the computer platform dialing up the CTI processor through the telephony network.

10. The method of claim 9 wherein the telephony network is a publicly-switched telephony network..

11. The method of claim 8 wherein the CTI processor at the call center is adapted as an Internet server, and in step (a) the data link is established by the computer platform at the remote agent station dialing up an Internet service provider and establishing an Internet connection to the CTI processor.

12. The method of claim 8 wherein, in step (h), the data forwarded is displayed as a screen pop on a video display connected to the computer platform at the remote agent station.

13. The method of claim 12 wherein the screen pop includes a script for the agent at the remote agent station.

14. The method of claim 8 wherein first control routines executing at the CTI processor and second control routines executing at the computer platform at the remote agent station are adapted to cooperate over the data link to provide call center services to the agent at the remote agent station.

15. A method for establishing a remote agent station from a call center having a CTI processor connected by CTI link to a telephony switch, comprising steps of:
    (a) receiving incoming calls at the call center;

14

(b) determining to switch a selected one of the incoming calls to an agent at the remote agent station;

(c) dialing a modem at a computer platform at the remote agent station by a modem connected to the CTI processor, establishing thereby a data connection between the computer platform at the remote agent station and the CTI processor;

(d) placing a call from the call center to a telephone at the remote agent station via a telephone line connected to the telephone;

(e) switching the selected incoming call to the remote agent station;

(f) retrieving data associated with the selected incoming call from a database at the call center; and

(g) forwarding the data associated with the selected incoming call to the computer platform at the remote agent station via the open data link.

16. The method of claim 15 wherein the telephony network is a publicly-switched telephony network..

17. The method of claim 15 wherein, in step (g), the data forwarded is displayed as a screen pop on a video display connected to the computer platform at the remote agent station.

18. The method of claim 17 wherein the screen pop includes a script for the agent at the remote agent station.

19. The method of claim 15 wherein first control routines executing at the CTI processor and second control routines executing at the computer platform at the remote agent station are adapted to cooperate over the data link to provide call center services to the agent at the remote agent station.

20. A home agent call center system, comprising:

a telephony switch connected to a first trunk adapted for receiving incoming calls from a telephony network, and to a second trunk adapted for placing outbound calls into the network;

a computer telephony integration (CTI) processor connected to the telephony switch and to a data base, the CTI processor executing a CTI application;

an agent station remote from the call center, the agent station having a telephone connected by a first telephony line to the telephony network and a computer platform with a video display unit (PC/VDU) connected by a second telephony line through a modem to the telephony network; and

a data port associated with the CTI processor adapted to establish a data connection;

wherein a data connection is established between the CTI processor and the computer station at the remote agent station, and as incoming calls are switched to the remote agent station, data pertaining to each incoming call is retrieved from the data base and sent via the open data link to the computer platform at the remote agent station to be displayed on the VDU.

21. The system of claim 20 wherein the data connection is established prior to a first call being switched to the remote agent station, and is maintained open thereafter as further calls are switched to the remote agent station.

22. The system of claim 20 wherein the computer platform at the remote agent station is characterized by a TAPI-compliant device connected to the telephone such that the computer platform may detect incoming telephone calls, and wherein, upon detecting a call from the call center, the computer platform immediately dials up the CTI-processor and establishes the data link by a reduced log-in procedure allowing a minimum time connection.

23. The system of claim 20 wherein the CTI-processor is characterized by having a modem bank adapted to dial outgoing calls, and wherein, as a call is selected to be switched to the remote agent station, the modem bank dials the remote agent station and establishes the data connection.

24. The system of claim 20 wherein the telephony network is a publicly-switched telephony network.

16

25. The system of claim 20 wherein the CTI-processor is adapted as an Internet-connected server, and the data link is established by the computer platform at the agent station dialing up an Internet service provider (ISP) and establishing an Internet link to the CTI-processor.
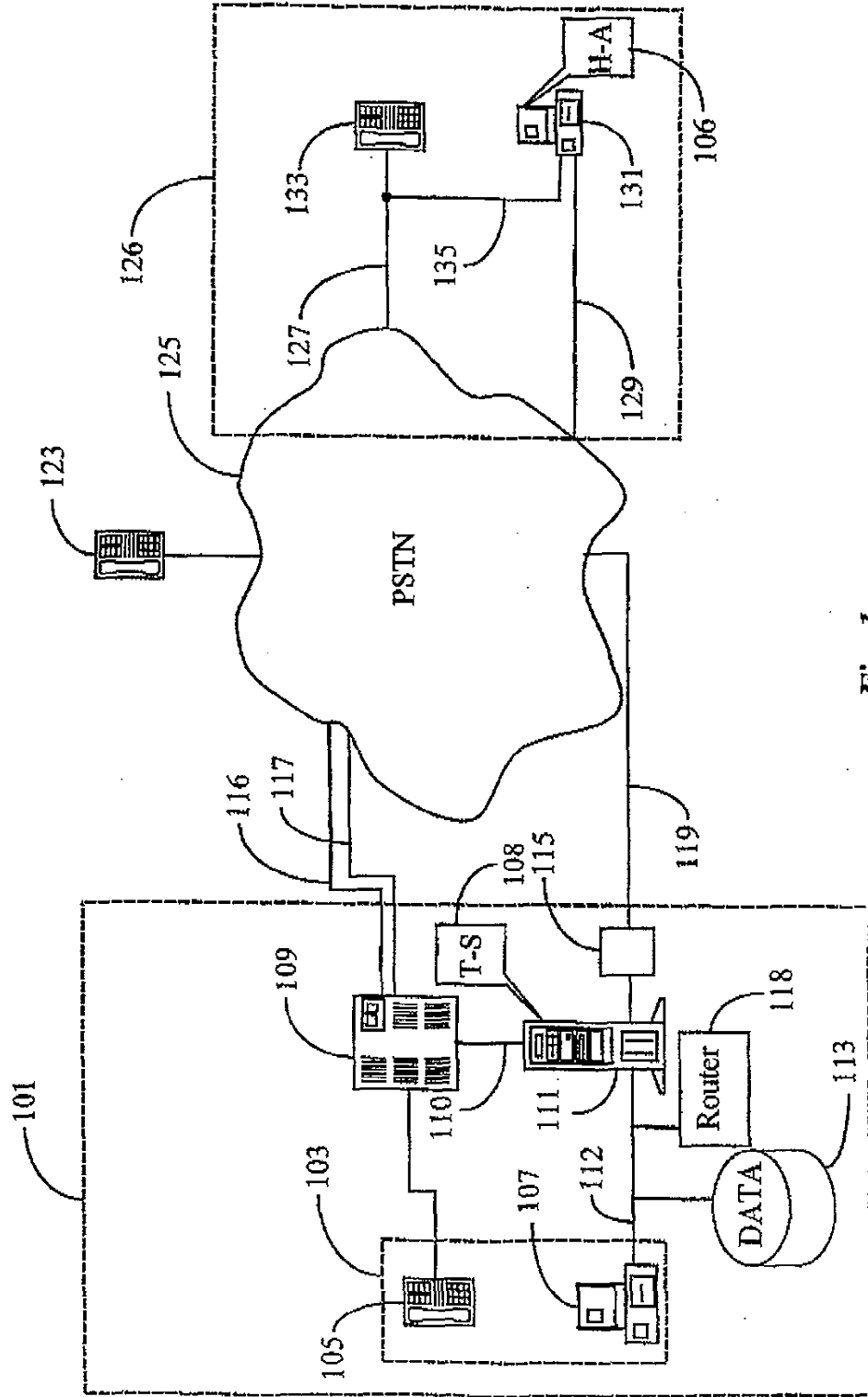
17

1/1

PSTN

T-S

Router

DATA

H-A

Fig. 1

PCT/US98/18853

A.	CLASSIFICATION OF SUBJECT MATTER

IPC(6) :H04M 3/00
US CL : 379/265

According to International Patent Classification (IPC) or to both national classification and IPC

B.	FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 379/265, 211, 212, 219, 220, 221; 370/352

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
APS

C.	DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y, P	US 5,796,791 A (POLCYN) 18 August 1998 (18.08.98), col. 2, line 58 through col. 3, line 22 and col. 9, lines 33-53.	1-7, 15-21 and 23-25
X, P	US 5,778,060 A (OTTO) 07 July 1998 (07.07.98), abstract and col. 2, line 27 through col. 10, line 35.	1-7, 15-21 and 23-35
Y	US 5,459,780 A (SAND) 17 October 1995 (17.10.95), abstract and FIGs. 1-8.	1-7, 15-21 and 23-25
Y	US 5,392,345 A (OTTO) 21 February 1995 (21.02.95), abstract and FIGs. 1-5.	1-7, 15-21 and 23-25
Y	US 5,608,786 A (GORDON) 04 March 1997 (04.03.97), col. 1, line 65 through col. 2, line 24 and FIGs. 1-5.	4 and 25

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance		
"E"	earlier document published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubt on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed	"&"	document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
26 OCTOBER 1998	**19 NOV 1998**

Name and mailing address of the ISA/US	Authorized officer
Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	SCOTT WOLINSKY _Diane Smith_
Facsimile No. (703) 305-3230	Telephone No. (703) 308-6731

Form PCT/ISA/210